

WHAT WE CLAIM IS:

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1. An anti-reflection film, which is formed by laminating a high-refractive-index layer, having a refractive index of 1.65 to 2.40, and a low-refractive-index layer, having a refractive index of 1.30 to 1.55, wherein the high-refractive-index layer comprises 5 to 65% by volume of inorganic fine particles having an average particle size of 1 to 200 nm and having a core/shell structure, and 35 to 95% by volume of a polymer composed of an organic compound.

2. The anti-reflection film as claimed in claim 1, wherein, in the inorganic fine particles having the core/shell structure, the main component of the core is titanium dioxide, the main component of the shell is an inorganic compound other than titanium dioxide, and the amount of the shell is 2 to 50% by weight to the core.

3. The anti-reflection film as claimed in claim 1, wherein the main component of the inorganic compound which constitutes the shell is at least one selected from the group of alumina, silica, and zirconia.

4. The anti-reflection film as claimed in claim 1, wherein the main component of the inorganic compound which

constitutes the shell is alumina.

5. The anti-reflection film as claimed in claims 1,  
wherein the polymer composed of an organic compound in the  
5 high-refractive-index layer is a crosslinked polymer  
having an anionic group.

6. The anti-reflection film as claimed in claim 5,  
wherein the polymer having an anionic group in the high-  
10 refractive-index layer is a polymer having a phosphoric  
acid group or a sulfonic acid group, as the anionic group.

7. The anti-reflection film as claimed in claim 5,  
wherein the polymer having an anionic group in the high-  
15 refractive-index layer further has an amino group or an  
ammonium group.

8. The anti-reflection film as claimed in claim 5,  
wherein the high-refractive-index layer is a layer formed  
20 by coating, and said polymer having the anionic group is a  
polymer formed by crosslinking reaction or polymerization  
reaction, simultaneously with or after coating the layer.

9. The anti-reflection film as claimed in claim 1,  
25 wherein the low-refractive-index layer comprises 50 to 95%  
by weight of the inorganic fine particles having an

average particle size of 0.5 to 200 nm and 5 to 50% by weight of a polymer, and wherein voids are formed among the inorganic fine particles in the layer.

5           10. The anti-reflection film as claimed in claim 1,  
wherein the low-refractive-index layer, having a  
refractive index of 1.30 to 1.55, comprises from 50 to 95%  
by weight of short fibrous inorganic fine particles, and  
10           from 5 to 50% by weight of a polymer, and wherein there  
are micro voids formed among the short fibrous inorganic  
fine particles.

11. An anti-reflection film comprising a low-  
refractive-index layer, having a refractive index of 1.30  
15           to 1.55, which comprises from 50 to 95% by weight of short  
fibrous inorganic fine particles, and from 5 to 50% by  
weight of a polymer, wherein there are micro voids formed  
among the short fibrous inorganic fine particles.

20           12. The anti-reflection film as claimed in claim 11,  
wherein the short fibrous inorganic fine particles  
comprises silica, and the low-refractive-index layer has a  
void ratio of 1 to 50% by volume.

25           13. The anti-reflection film as claimed in claim 11,

wherein the short fibrous inorganic fine particles are substantially crosslinked.

14. The anti-reflection film as claimed in claim 11,  
5 which comprises a high-refractive-index layer comprising from 5 to 65% by volume of inorganic fine particles that have an average particle size of 1 to 200 nm, and from 35 to 95% by volume of a crosslinked polymer having an anionic group.

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15. The anti-reflection film as claimed in claim 14, wherein the polymer having an anionic group in the high-refractive-index layer is a polymer having a phosphoric acid group or a sulfonic acid group, as the anionic group.

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16. The anti-reflection film as claimed in claim 14, wherein the polymer having an anionic group in the said high-refractive-index layer further has an amino group or an ammonium group.

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17. The anti-reflection film as claimed in claim 14, wherein the inorganic fine particles of the high-refractive-index layer have a refractive index of 1.80 to 2.80.

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18. The anti-reflection film as claimed in claim 14,  
wherein the polymer having an anionic group is a polymer  
formed by crosslinking reaction or polymerization reaction,  
simultaneously with or after coating the high-refractive-  
5 index layer.

19. The anti-reflection film as claimed in claim 14,  
wherein the high-refractive-index layer comprises  
inorganic fine particles having an average particle size  
10 of 1 to 200 nm and having a core/shell structure.

20. The anti-reflection film as claimed in claim 1  
or 11, wherein an over coat layer containing a fluorine-  
containing compound is laminated on the low-refractive-  
15 index layer.

21. The anti-reflection film as claimed in claim 20,  
wherein the occupation ratio of materials for the over  
coat layer is less than 70% by volume of the voids in the  
20 low-refractive-index layer.

22. The anti-reflection film as claimed in claim 20,  
wherein the weight-average molecular weight of the  
fluorine-containing compound forming the over coat layer  
25 is 20,000 to 2,000,000, and wherein low molecular weight

components, having a molecular weight less than 20,000, which are other than the fluorine-containing compound, is 50% or less by weight in the solid content of the over coat layer.

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23. The anti-reflection film as claimed in claim 20, wherein the fluorine-containing compound is a fluoropolymer, which is a polymer formed by crosslinking reaction or polymerization reaction, simultaneously with or after the coating of the over coat layer.

24. An image display device equipped with the anti-reflection film as claimed in claim 1 or 11 on an image display surface.

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25. A polarizing plate comprising a polarizing layer interposed between two transparent supports, wherein the polarizing plate has an optical compensative layer containing an optical anisotropic layer, on the surface of one of the transparent supports opposite to the polarizing layer, and has an anti-reflection film on the surface of the other transparent support opposite to the polarizing layer, and wherein the optical anisotropic layer comprises a compound with a discotic structure unit and having a negative birefringence, disk surfaces of the discotic

structure unit being inclined to the surface of the transparent support at angles changed to each other for the surface of the transparent support with respect to the direction of depth of the optical anisotropic layer.

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26. The polarizing plate as claimed in claim 25, wherein the angle is increased with the increase of distance between the optical anisotropic layer and the surface of the transparent support.

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27. The polarizing plate as claimed in claim 25, wherein the optical anisotropic layer further contains a cellulose ester.

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28. The polarizing plate as claimed in claim 25, wherein the transparent support of the optical anisotropic layer side has an optically negative uniaxial property, and has an optic axis in the direction of normal line of the surface of the transparent support, and satisfies the following condition:

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$$20 \leq \{ (n_x + n_y) / 2 - n_z \} \times d \leq 400$$

wherein d represents a thickness of the optical compensative layer (unit: nm); nx, ny, and nz represent

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main refractive indices of three orthogonal axes of the optical compensative layer,  $n_z$  represents a main refractive index in the direction of thickness of the transparent support, and the axes satisfy a relation of  $n_x$   
5  $\leq n_z \leq n_y$ , when it is viewed from the front.

29. The polarizing plate as claimed in claim 25, wherein an alignment layer is formed between the optical anisotropic layer and the transparent support.  
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30. The polarizing plate as claimed in claim 29, wherein the alignment layer comprises a cured polymer.

31. The polarizing plate as claimed in claim 25, wherein the optical anisotropic layer is composed of monodomain or a number of domains having a size of  $0.1 \mu\text{m}$  or less.  
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32. The polarizing plate as claimed in claim 25, wherein the anti-reflection film comprises a low-refractive-index layer, which has a lower refractive index than that of the transparent support to which the layer is laminated and has a void percentage of 1-50% by volume.  
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is 20,000-2,000,000, and low molecular weight components, having a molecular weight less than 20,000, other than the fluorine-containing compound, is 50% or less by weight of solid components of the over coat layer.

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38. The polarizing plate as claimed in claim 25, wherein the anti-reflection film is the anti-reflection film as claimed in claim 1 or 11.

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39. A liquid-crystal-display-type image display device comprising the polarizing plate as claimed in claim 25 used as a polarizing plate on the side of display out of the two polarizing plates disposed on both sides of the liquid crystal cell, wherein the polarizing plate is arranged in such manner that the optical anisotropic layer being faced to the liquid crystal cell side.

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40. A color liquid-crystal-display-type image display device, comprising

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a pair of substrates having transparent electrodes, pixel electrodes, and a color filter,

a liquid crystal cell sealed between the substrates and comprising a twisted nematic liquid crystal,

a pair of optical compensative sheets provided on both sides of the liquid crystal cell, and

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a pair of polarizing plates provided respectively on the outside of the optical compensative sheets; wherein use is made of,

A the polarizing plate according to any one of the  
5 aforesaid claims 25 to <sup>37</sup>~~38~~, as the optical compensative sheet on the displaying side of the liquid crystal cell and the polarizing plate, in which an optical anisotropic layer is disposed facing to the liquid crystal cell side, and

10 an optical compensative sheet, which comprises an optical anisotropic layer having a negative birefringence and comprising a compound that has discotic structure units, at the side of a backlight of the liquid crystal cell; wherein disk surfaces of the discotic structure unit  
15 are inclined to the surface of a transparent support at angles changed to each other for the transparent support surface with respect to the direction of depth of the optical anisotropic layer.